



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/771,920	02/04/2004	Frank Hershkowitz	JJD-0404	3496
27810	7590	08/25/2005	EXAMINER	
EXXONMOBIL RESEARCH AND ENGINEERING COMPANY P.O. BOX 900 1545 ROUTE 22 EAST ANNANDALE, NJ 08801-0900			PARSA, JAFAR F	
			ART UNIT	PAPER NUMBER
			1621	

DATE MAILED: 08/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/771,920

**Applicant(s)**

HERSHKOWITZ, FRANK

**Examiner**

Jafar Parsa

**Art Unit**

1621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>3/16/2005</u>   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Kennedy (US 2001/0027220).

Kennedy teaches a process for converting light hydrocarbons to heavier hydrocarbons includes steps of: preparing a first synthesis gas having a hydrogen to carbon monoxide ratio greater than 2:1; removing a portion of the hydrogen from the first synthesis gas; preparing a second synthesis gas with a CO<sub>2</sub> recycle wherein the second synthesis gas has a hydrogen to carbon monoxide ratio less than 2:1; adding the removed hydrogen to the second synthesis gas to increase the H<sub>2</sub>:CO ratio of the second synthesis gas; and using a Fischer-Tropsch reaction to convert the first synthesis gas and the second synthesis gas to heavier hydrocarbons (see page 2, left col., lines 1-11). An advantage of the present invention is that an autothermal reformer may be utilized at high pressure thereby allowing the removal of a synthesis gas booster compressor but without suffering a loss in carbon efficiency for the higher pressure. With respect to this advantage, the carbon efficiency of the autothermal reformer is reduced at higher pressure, but since CO<sub>2</sub>, which is produced at the higher

Art Unit: 1621

pressure, is recycled, the effective efficiency is not reduced by increasing pressure (see paragraph 0015).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kennedy in view of Brown et al (USPN 6,495,610) and further in view of Davis et al (US 2002/0170228).

Applicants' claimed invention is related to a method for producing liquid hydrocarbons by first generating in a pressure swing reformer a synthesis gas stream having a mole ratio of H<sub>2</sub>:CO greater than 2:1. Then, a portion of the hydrogen is separated to produce a synthesis gas stream having a mole ratio of H<sub>2</sub>:CO of about 2:1 which steam is then introduced into a hydrocarbon synthesis reactor for conversion to liquid products. The separated hydrogen is introduced to the reformer as fuel source.

Art Unit: 1621

The Fischer-Tropsch process is exothermic and water is used for cooling the hydrocarbon synthesis reactor to produce steam and introducing the steam into the reformer for reforming hydrocarbons.

Kennedy teaches a process for converting light hydrocarbons to heavier hydrocarbons includes steps of: preparing a first synthesis gas having a hydrogen to carbon monoxide ratio greater than 2:1; removing a portion of the hydrogen from the first synthesis gas; preparing a second synthesis gas with a CO<sub>2</sub> recycle wherein the second synthesis gas has a hydrogen to carbon monoxide ratio less than 2:1; adding the removed hydrogen to the second synthesis gas to increase the H<sub>2</sub>:CO ratio of the second synthesis gas; and using a Fischer-Tropsch reaction to convert the first synthesis gas and the second synthesis gas to heavier hydrocarbons (see page 2, left col., lines 1-11). An advantage of the present invention is that an autothermal reformer may be utilized at high pressure thereby allowing the removal of a synthesis gas booster compressor but without suffering a loss in carbon efficiency for the higher pressure. With respect to this advantage, the carbon efficiency of the autothermal reformer is reduced at higher pressure, but since CO<sub>2</sub>, which is produced at the higher pressure, is recycled, the effective efficiency is not reduced by increasing pressure (see paragraph 0015).

Kennedy does not teach using at least a part of the separated hydrogen into the reformer as a fuel source. However, in a similar process Brown teaches that a portion of hydrogen separated from the synthesis gas and the separated hydrogen is used as fuel, e.g. that combusted to heat the reformer tubes (see col. 2, lines 51-67). It would

Art Unit: 1621

therefore have been obvious to one of ordinary skill in the art at the time the invention was made to utilize at least part of the separated hydrogen from the syngas as a fuel source to heat the reactor, in order to reform the hydrocarbon feedstock to synthesis gas, which is more suited to the Fischer-Tropsch reaction.

The claims further differ in cooling the hydrocarbon synthesis reactor with water to produce steam and using the steam in the reformer for reforming hydrocarbons. However, Davis teaches that converting natural gas to a hot synthesis gas which is cooled by indirect heat exchange with water to produce steam. The synthesis gas is contacted with hydrocarbon synthesis catalyst to produce liquid hydrocarbons and water vapor. Part of the steam either from cooling the hot synthesis gas or from hydrocarbon synthesis reaction is used for reforming hydrocarbons (see paragraph 0010-0014 and paragraph 0007). As is known, the Fischer-Tropsch process is exothermic and water is used to control the temperature with steam is being produced. It would therefore have been obvious to one of ordinary skill in the art at the time the invention was made to remove the excess heat from the hydrocarbon synthesis reaction by cooling the hydrocarbon synthesis reactor to produce steam, in order to better control the exothermic heat produced in the Fischer-Tropsch process during the reaction.

### ***Double Patenting***

A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

Art Unit: 1621

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Claims 1-15 provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 1-12 of copending Application No. 10/756,651. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 8-15 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4 and 12 of copending Application No. 10/458,399 in view of Brown et al (USPN 6,495,610) and further in view of Davis et al (US 2002/0170228).

This is a provisional obviousness-type double patenting rejection.

Hershkowitz teaches a cyclic reforming and re-heating process comprising: (a) reforming a hydrocarbon by introducing at least a portion of said hydrocarbon along with

Art Unit: 1621

steam and optionally CO.sub.2 at a space velocity of at least 500 hr.sup.-1, through a first end of a first zone containing bed packing materials and catalyst; (b) passing at least a portion of the product of step (a) to a second zone containing bed packing materials, and transferring the sensible heat from the product to the packing materials; (c) removing substantially all of the product from said second zone; (d) introducing an oxygen-containing gas into a first end of said second zone; and (e) contacting said oxygen-containing gas with a fuel and combusting said gas and fuel within said zones, thereby re-heating said first zone to reforming temperatures and creating a fluegas which exits through the first end of said first zone.

Hershkowitz does not teach using at least a part of the separated hydrogen into the reformer as a fuel source. However, in a similar process Brown teaches that a portion of hydrogen separated from the synthesis gas and the separated hydrogen is used as fuel, e.g. that combusted to heat the reformer tubes (see col. 2, lines 51-67). It would therefore have been obvious to one of ordinary skill in the art at the time the invention was made to utilize at least part of the separated hydrogen from the syngas as a fuel source to heat the reactor, in order to reform the hydrocarbon feedstock to synthesis gas, which is more suited to the Fischer-Tropsch reaction.

The claims further differ in cooling the hydrocarbon synthesis reactor with water to produce steam and using the steam in the reformer for reforming hydrocarbons. However, Davis teaches that converting natural gas to a hot synthesis gas which is cooled by indirect heat exchange with water to produce steam. The synthesis gas is contacted<sup>+</sup> with hydrocarbon synthesis catalyst to produce liquid hydrocarbons and water



Art Unit: 1621

vapor. Part of the steam either from cooling the hot synthesis gas or from hydrocarbon synthesis reaction is used for reforming hydrocarbons (see paragraph 0010-0014 and paragraph 0007). As is known, the Fischer-Tropsch process is exothermic and water is used to control the temperature with steam is being produced. It would therefore have been obvious to one of ordinary skill in the art at the time the invention was made to remove the excess heat from the hydrocarbon synthesis reaction by cooling the hydrocarbon synthesis reactor to produce steam, in order to better control the exothermic heat produced in the Fischer-Tropsch process during the reaction.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jafar Parsa whose telephone number is (571)272-0643. The examiner can normally be reached on 8 a.m.-4:30 p.m. (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter can be reached on (571)272-0646. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

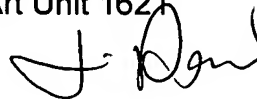
Jafar Parsa

Application/Control Number: 10/771,920  
Art Unit: 1621

Page 9

JP  
August 21, 2005

Primary Examiner  
Art Unit 1621

A handwritten signature in black ink, appearing to read 'J. Parsa', written over the printed name.

**J. PARSA**  
**PRIMARY EXAMINER**